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Review of Q fever cases in and around Yozgat province

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ABSTRACT

Aims: Q fever is a prevalent disease, especially encountered in endemic areas, and presents itself with non-specific symptoms such as fever, arthralgia and widespread body pain, and cough. It can have various acute or chronic presentations. However, significantly rapid recovery is achieved with early diagnosis and treatment. Our study aimed to raise awareness about this disease, which seems simple but requires clinical suspicion, and support the treatment approach.

Methods: 92 individuals who applied to our hospital between 2017 and 2022 and were diagnosed with Q fever by microbiological tests were included in the study. These patients' symptoms, blood hemogram, AST, ALT, ALP, CRP values and their response to treatment were taken from patient files and analyzed.

Results: 92 patients were serologically diagnosed with Q fever. Of these, 44 (48.2%) were male, and 48 (51.8%) were female. 29 (31.5%) had afever, 32 (34.8%) had joint pain, 13 (14.1%) had a cough, and 44 (47.8%) had widespread body pain. Pneumonia developed in 18 (19.6%) patients and hepatitis in 16 (17%). Tetracycline was started in 74 patients as first-line therapy and replaced with quinolone in one patient because of intolerance. First-line quinolone therapy was used in 18 pneumonia patients.

Conclusion: First-line quinolone treatments were effective.

Keywords: Q fever case, Yozgat, endemic area

INTRODUCTION

Q-fever is a febrile bacterial infection caused by *Coxiella burnetii*. It is encountered both as sporadic cases and endemic in the world. It is transmitted from mammals such as goats, sheep, and cattle by birds and arthropods such as ticks. Birth leftovers are considered the most important source of transmission of bacteria to pastures and soils because they contain high amounts of bacteria. Q-fever is accepted as an occupational disease caused by close contact with farm animals. It can also rarely occur in laboratory workers. Transmission to humans through contact with fluids such as urine, feces, birth leftovers, milk of infected animals, inhalation and oral intake is common.[1-5]

The disease incubation period is 14-39 days, with an average of 20 days. Patients are usually asymptomatic, but some also apply with nonspecific complaints such as fever, widespread pain, arthralgia and cough. Clinical presentations in the acute or chronic picture include febrile disease, pneumonia, endocarditis, hepatitis, and osteomyelitis. It may also appear in different forms in infants, pregnant and malignant patients.[1,2,6,7]

Making a diagnosis is challenging due to the lack of specific symptoms. Serologic tests are used in the diagnosis. The Indirect Fluorescent Antibody (IFA) test is accepted as the reference method. For a definitive diagnosis, either a 4-time increase should be observed between phase-2 IgG antibody titers of acute and convalescent serums or seroconversion should occur in phase-2 antibody titers of double serum samples taken at a 14-day interval. Phase-2 IgM antibodies are formed rapidly, reaching a maximum value on the 14th day and remaining in the blood for 10-12 weeks. IFA may be negative early, and PCR may be necessary. It can be isolated from culture under high biosafety laboratory conditions.[7-9]

All symptomatic patients should be treated. It is crucial to start the treatment at an early stage. The recommended treatment in adults is first-line doxycycline, administered 2x100mg for 14 days. Chloramphenicol and rifampin can be used as well. Although studies have shown the efficacy of quinolones, further clinical experience is needed. There is insufficient data on their efficacy in the treatment of pneumonia. Trimethoprim-sulfamethoxazole can be used in pregnant women. On the other hand, individuals with endocarditis need a longer duration with combined treatment.[8,9] Our study aimed to examine the complaints of Q-fever cases frequently seen in our region, underline the symptoms that should be paid attention to for early diagnosis and evaluate the treatment using the data at hand.[8-10]

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METHODS

The study was designed as a retrospective cross-sectional study. Data were collected after getting the approval of the Yozgat Bozok University Medical Faculty Clinical Researches Ethics Committee (Date: 15.12.2022, Decision No: 2017-KAEK189_2022_15_18).

The files of 92 individuals admitted to our hospital between 2017-2022 and were found positive for Q-fever by IFA test were reviewed. Age, gender, initial complaints and serum ALT, AST, ALP and CRP values of the patients were recorded.

Statistical Analysis

Categorical measurements were given as numbers and percentages, and continuous measurements as mean and standard deviation (median and min-max where necessary). The Chi-Square test was employed to test the significance of the difference between means and to evaluate the data obtained by counting.

RESULTS

The number of individuals in the study was 92; 44 (48.2%) were male, and 48 (51.8%) were female. The minimum and maximum ages of the individuals were 16 and 77, and the mean age was 49.00±15.40. The mean age of males and females was 48.25±15.05 and 49.68±15.80, respectively.

Of 92 patients, 29 (31.5%) had a fever, 32 (34.8%) had arthralgia, 13 (14.1%) had a cough, and 44 (47.8%) had widespread pain (**Table 1**). 18 patients (19.6%) were treated with a diagnosis of pneumonia. Of these 18 patients, only 1 had disseminated pneumonia and achieved complete recovery with treatment. 1 patient was treated with quinolone therapy due to tetracycline allergenicity; the remaining 73 patients received tetracycline therapy.

16 patients had elevated liver enzymes and were followed up for hepatitis. In all patients, the values decreased to the normal range with treatment. Regarding patients with concomitant elevated liver enzymes, ALP (30-120) was approximately 1.5 times higher than the reference value in 6 patients, and GGT (0-38) was 1-1.5 times higher than the reference value in 5 patients.

Acute phase reactant CRP (0-6) was elevated in 39 patients (54.16%) and decreased to the normal range during follow-up.

DISCUSSION

In a large-scale study with the participation of 29 European countries, 1,069 people diagnosed with Q-fever were followed. Spain, Romania and Bulgaria reported the highest cases in Europe.[11] The United States reported 193 Q-fever cases in 2017. In most of these countries, Q-fever has been recognized as a nationally notifiable disease.[12] In our country, the first outbreak was identified with 21 cases in Aksaray in 1947.[13,14] Subsequently, a series of studies were carried out on *C. burnetti*, aiming to draw attention to endemic regions and individuals in the risk group. In 2006, a study conducted on 92 individuals in the Aydın region examined seropositivity in groups with occupational exposure and found it to be high.[15] In a study conducted in the Hatay region among veterinarians and slaughterhouse workers, seroprevalence was found to be high in the risk group, drawing attention to conducting research in endemic regions.[16] The study of Kılıç et al.[17] in Ankara investigated the seroprevalence in veterinarians and animal lovers and emphasized the importance of raising awareness in these risk groups. A prevalence study was conducted in Ankara by taking 601 serum samples from blood donors to see the prevalence in the whole community, not only in the risk group. Seropositivity was higher in males than females, and 87% of seropositive donors had contact with farm animals. The study by Çelebi et al.[2] showed that Ankara is an endemic region.[18] In the study by Kılıç et al.[19] the highest seropositivity was observed in the Central Anatolia region.

Although it can occur at any age, the associatiom-n of the disease with increasing age was shown. It is higher in males than females, which can be explained by occupational exposure. The cases can be seen at any time of the year; however, they are mostly reported in spring and early summer.[20-22] A higher seroprevalence was reported among women in a study conducted in Elazığ. This difference could be explained by the fact that domestic animal husbandry is more common in that part of Turkey, and women are more engaged in this work.[23] In our study, 44 (48.2%) of 92 individuals were male, and 48 (51,8%) were female, and no statistically significant difference was found according to gender.

Similar to the study by Derrick et al.[24], the common complaints of the patients in our study were fever, widespread pain, arthralgia and cough. The reason for the lower frequency of fever complaints was thought to be that the patients presented after the acute febrile period had passed or that other febrile diseases were initially considered in patients applying with fever, and this period may have passed.[25] 16 patients had elevated liver enzymes and were followed up with hepatitis. Although only two of these patients had a later recovery, all patients responded to the treatment.

In the study by Coşkunlar et al.[26] in Ankara, 47% of 106 patients with atypical pneumonia were serologically positive for Q-fever. However, it is difficult to evaluate the role of *C. burnetii* in the aetiology of atypical pneumonia since the number of studies on *C. burnetti* as the causative agent in patients diagnosed with pneumonia is not sufficient. In our study, 18 (19.6%) individuals were followed up with pneumonia. However, a prospective study on all pneumonia patients is needed to evaluate its role in atypical pneumonia.

In our study, tetracycline, the first-line treatment, was initiated in 74 individuals; quinolone treatment was preferred in one patient due to tetracycline intolerance. In addition, the treatment of 18 individuals diagnosed with pneumonia was started with quinolone, the first-line treatment. Raoult et al.[27] emphasized the insufficiency of data on the studies involving the role of quinolones in Q-fever treatment. Our study supports that quinolones are as effective and sufficient as tetracyclines regarding the results of the group that developed pneumonia. Although resistance to tetracyclines was not mentioned, the results show that quinolones may be an alternative first-line treatment to tetracyclines in future. The rapid clinical recovery of pneumonia patients and the absence of intensive care unit hospitalization and mortality may be attributed to the use of quinolones.

Q-fever should be suspected in the following patient groups because the diagnosis in these patients is only possible with clinical suspicion: patients with unexplained hepatitis, patients with unexplained ALP or GGT elevations, patients with elevated acute phase reactants such as CRP, and patients with a history of travel to or from endemic areas.[28,30]

CONCLUSION

Q-fever is a disease prevalent in the community, especially in endemic regions; contrary to popular belief, it is difficult to diagnose as it presents nonspecific symptoms. Early diagnosis provides a significant and rapid recovery. Therefore, awareness should be raised for early diagnosis and treatment; internal medicine and surgical branch physicians should be informed about its different clinical presentations, such as hepatitis, osteomyelitis and pneumonia, especially in endemic regions. Furthermore, it should be added to the infectious pathologies investigated, especially in cases of unexplained hepatitis. In addition, contrary to popular belief, quinolones are as effective as tetracyclines in the treatment.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was initiated with. the approval of the Yozgat Bozok University Medical Faculty Clinical Researches Ethics Committee (Date: 15.12.2022, Decision No: 2017-KAEK189_2022_15_18).

Informed Consent: Written consent was obtained from the patient participating in this study.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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